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**UNITED STATES DEPARTMENT OF COMMERCE  
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/688,541      10/16/00      SHIMODA

K      09792909-465

026263      IM52/1022  
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EXAMINER
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MARKHAM, W	
ART UNIT	PAPER NUMBER

1762  
DATE MAILED:

10/22/01

*7*

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

# Office Action Summary

Application No.

09/688,541

Applicant(s)

SHIMODA ET AL.

Examiner

Wesley D Markham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) 1-4 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 5, 6 and 8 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 October 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1 – 4, drawn to an optical component producing apparatus, classified in class 118, subclass 688.
- II. Claims 5 – 8, drawn to an optical component producing method for forming a multi-layer film, classified in class 427, subclass 10.

2. The inventions are distinct, each from the other because of the following reasons:

3. Inventions II and I are related as process and apparatus for its practice, respectively.

The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case, the apparatus as claimed can be used to practice another and materially different process, such as a process which comprises forming stacked layers the same in optical characteristic, or a process which comprises forming only a single-layer film as opposed to a multi-layer film.

4. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

5. During a telephone conversation with Mr. David Metzger on 10/15/01 a provisional election was made without traverse to prosecute the invention of Group II, Claims 5 – 8. Affirmation of this election must be made by applicant in replying to this Office

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action. Claims 1 – 4 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a petition under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

#### ***Priority***

7. Acknowledgment is made of applicant's claim for priority under 35 U.S.C. 119(a)-(d) based upon an application filed in Japan on 10/15/1999. A claim for priority under 35 U.S.C. 119(a)-(d) cannot be based on said application, since the United States application was filed more than twelve months thereafter. Specifically, Application No. JP 11-294406 was filed on 10/15/1999, and the instant application was filed on 10/16/2000.

#### ***Drawings***

8. Figures 14 and 15 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

#### ***Specification***

9. The disclosure is objected to because of the following informalities.

- The incorporation of essential material in the specification by reference to a foreign application or patent, or to a publication is improper (see applicant's preliminary amendment A, filed as paper #5 on 10/16/2000, in which JP 11-294406 was incorporated by reference). Applicant is required to amend the disclosure to include the material incorporated by reference. The amendment must be accompanied by an affidavit or declaration executed by the applicant, or a practitioner representing the applicant, stating that the amendatory material consists of the same material incorporated by reference in the referencing application. See *In re Hawkins*, 486 F.2d 569, 179 USPQ 157 (CCPA 1973); *In re Hawkins*, 486 F.2d 579, 179 USPQ 163 (CCPA 1973); and *In re Hawkins*, 486 F.2d 577, 179 USPQ 167 (CCPA 1973).
- Pg.22 – The phrase, "one example of a difference in final transmittance distribution between an optical component in which the thickness adjustment by using the optical monitor is performed and an optical component in which the thickness adjustment by using the optical monitor is performed" is confusing. The applicant is suggested to change the phrase to read, "one example of a difference in final transmittance distribution between an optical component in which the thickness adjustment by using the optical monitor is performed and an optical component in which the thickness adjustment by using the optical monitor is not performed".

Appropriate correction is required.

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### ***Claim Objections***

10. Claims 7 and 8 are objected to because of the following informalities.

- Claim 7 – The phrase, “further comprising removal step...” is improper grammar. A suggestion is to change the phrase to read, “further comprising a removal step...”
- Claim 8 – The phrase, “wherein said control steps comprises...” is improper grammar. A suggestion is to change the phrase to read, “wherein said control steps comprise...”

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

11. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

12. Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

13. Specifically, the phrase, “one layer having a higher refractive index...” in Claim 8 is vague and indefinite. It is unclear what the refractive index is being compared to (i.e., what is the refractive index higher than?)

14. Specifically, the phrase, "being positioned near the uppermost surface..." in Claim 8 is vague and indefinite. It is unclear how "near" the uppermost surface the layer is required to be (i.e., one layer from the top, two layers from the top, etc.).

***Claim Rejections - 35 USC § 102***

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

16. Claims 5 and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Sullivan et al. (USPN 6,217,720 B1).
17. Regarding Claim 5, Sullivan et al. teach an optical component producing method for forming a multi-layer film, which is composed of alternately stacked layers different in optical characteristic on a base (Abstract, Col.5, lines 40 – 52, Col.9, lines 32 – 67, Col.10, lines 1 – 19), the method comprising measuring an optical characteristic of the optical component obtained by forming the multi-layer film on the base (Col.4, lines 36 – 56) and controlling, on the basis of the measured optical characteristic of the optical component, a thickness of a portion of the multi-layer film to be formed on the base (Col.4, lines 36 – 56, Col.7, lines 51 – 67, Col.8, lines 1 – 10).

18. Sullivan et al. teach all the limitations of Claim 8 as set forth in paragraph 17 above, including a method wherein the control steps comprise the step of controlling a thickness of one layer of the plurality of alternately stacked layers, the one layer having a higher refractive index than a different deposited layer and being positioned near the uppermost surface remotest from the base. Specifically, Sullivan et al. teach controlling the thickness of each layer in the multi-layer film (Figure 13), which includes controlling the thickness of a  $\text{Nb}_2\text{O}_5$  layer, which has a higher refractive index than the other deposited layer (i.e.,  $\text{SiO}_2$ ) (Col.10, lines 50 – 64). Because Sullivan et al. teach controlling the thickness of each layer of the film, Sullivan et al. would have inherently controlled the thickness of a layer “near the uppermost surface remotest from the base.”
19. Claim 5 is rejected under 35 U.S.C. 102(b) as being anticipated by Barret et al. (JP 11-119002 A).
20. Regarding Claim 5, Barret et al. teach an optical component producing method for forming a multi-layer film, which is composed of alternately stacked layers different in optical characteristic on a base (paragraphs [0004] through [0006], Table 1, and Figure 2), the method comprising measuring an optical characteristic of the optical component obtained by forming the multi-layer film on the base and controlling, on the basis of the measured optical characteristic of the optical component, a thickness of a portion of the multi-layer film to be formed on the base (Solution and paragraph [0014]).



21. Claim 5 is rejected under 35 U.S.C. 102(b) as being anticipated by Holland (USPN 4,311,725).
22. Regarding Claim 5, Holland teaches an optical component producing method for forming a multi-layer film, which is composed of alternately stacked layers different in optical characteristic on a base, the method comprising measuring an optical characteristic of the optical component obtained by forming the multi-layer film on the base and controlling, on the basis of the measured optical characteristic of the optical component, a thickness of a portion of the multi-layer film to be formed on the base (Abstract, Col.7, lines 43 – 68, Col.8, lines 1 – 40).

***Claim Rejections - 35 USC § 103***

23. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

24. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barret et al. (JP 11-119002 A).
25. Barret et al. explicitly teach all the limitations of Claim 8 as set forth in paragraph 20 above, except for a method wherein the control steps comprise the step of controlling a thickness of one layer of the plurality of alternately stacked layers, the

one layer having a higher refractive index than a different deposited layer and being positioned near the uppermost surface remotest from the base. However, Barret et al. teach forming a multi-layer film comprising alternately stacked layers of  $\text{Nb}_2\text{O}_5$  (higher refractive index) and  $\text{SiO}_2$  (lower refractive index) (Table 1). In addition, Barret et al. teach that the film thicknesses (plural) of the multi-layer film are adjusted by using an optical monitor to satisfy prescribed transmittance characteristics (Solution). Therefore, it would have been obvious to one of ordinary skill in the art to control all the film thicknesses using the optical monitor with the reasonable expectation of successfully obtaining a prescribed transmittance for each layer, thereby producing an optical part with good optical characteristics as desired by Barret et al. In controlling all the film thicknesses of the multi-layer film, Barret et al. would have inherently controlled a thickness of an  $\text{Nb}_2\text{O}_5$  layer "near the uppermost surface remotest from the base".

26. Claims 6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holland (USPN 4,311,725).
27. Holland teaches all the limitations of Claim 6 as set forth above in paragraph 22 and below. Specifically, Holland teaches that the measurement step comprises the step of measuring the transmittance of the optical component (Col.8, lines 32 – 36). In the multi-layer film embodiment, Holland does not explicitly teach terminating the film formation when the measured transmittance of the optical component is changed to be decreased. In this embodiment, Holland teaches that the deposition

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is controlled to be terminated "at a required value". In addition, Holland also teaches that it is often a requirement to terminate deposition at a transmittance maximum or minimum, corresponding to a quarter-wave thick film, or a multiple thereof (Col.4, lines 21 – 25). The transmittance maximum is the point when the transmittance begins to decrease. Therefore, it would have been obvious to one of ordinary skill in the art to terminate the deposition of a portion of the multi-layer film of Holland when the measured transmittance is changed to be decreased as taught by Holland with the reasonable expectation of successfully forming a multi-layer interference filter having a quarter-wave thick film, as taught to often be a requirement by Holland.

28. Holland teaches all the limitations of Claim 8 as set forth in paragraph 22 above, except a method that comprises controlling a thickness of a layer of the plurality of alternately stacked layers, the layer having a higher refractive index than a different deposited layer and being positioned near the uppermost surface remotest from the base. However, Holland teaches forming multi-layer interference filters comprising a lower layer of silicon dioxide (lower refractive index) and an upper layer of titanium oxide (higher refractive index) (Col.8, lines 22 – 40). Holland only explicitly teaches the layer thickness control (i.e., terminating the deposition at a required transmittance value) for the silicon oxide layer. Holland goes on to state that a "titanium oxide film is then deposited as required" without explicitly stating that the layer thickness control system is used (Col.8, lines 39 – 40). However, it is clearly the intent of Holland to measure and control the thickness of a number of optical films, both single and multi-layer (Col.1, lines 4 – 53). As such, it would have been

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obvious to one of ordinary skill in the art to control the thickness of the titanium oxide film of Holland (i.e., the higher refractive index film positioned remotest from the base) in addition to controlling the thickness of the lower layer silicon dioxide film with the reasonable expectation of success (as the apparatus of Holland is capable of doing so) and with the reasonable expectation of terminating the deposition at a required thickness value based on transmittance, therefore forming a higher quality, more reproducible end product.

***Allowable Subject Matter***

29. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
30. Claim 7 contains allowable subject matter because the prior art of record does not teach or reasonably suggest a method of forming an optical component by depositing a multi-layer film on a base and controlling the layer thickness based on transmittance, further comprising a removal step of removing a layer portion formed during a period of time from a time point when the increase/decrease of the measured mean light transmittance of the optical component is stopped to a time point when the measured mean light transmittance is changed to be decreased.


**Conclusion**

31. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D Markham whose telephone number is (703) 308-7557. The examiner can normally be reached on Monday - Friday, 7:30 AM to 4:30 PM.
32. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (703) 308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-5408 for regular communications and (703) 305-3599 for After Final communications.
33. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Wesley D Markham  
Examiner  
Art Unit 1762

WDM

WDM  
October 19, 2001

  
**SHRIVE P. BECK**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 1700**